



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/598,285

06/21/2007

Gerold Gruendler

I431.174.101/FIN565PCT/US

2329

25281

7590

01/21/2009

DICKE, BILLIG & CZAJA

FIFTH STREET TOWERS

100 SOUTH FIFTH STREET, SUITE 2250

MINNEAPOLIS, MN 55402

EXAMINER

THOMAS, BRADLEY H

ART UNIT

PAPER NUMBER

2835

MAIL DATE

DELIVERY MODE

01/21/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/598,285	Applicant(s) GRUENDLER ET AL.	
	Examiner BRADLEY H. THOMAS	Art Unit 2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10,11,14-19,22-28 and 30-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10,11,14-19,22-28 and 30-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 October 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Acknowledgement is made of the amendment filed 10/10/08.

Claim Objections

2. Claims 10, 26 and 27 are objected to because of the following informalities: In Claim 10, line 8, there is an improper period after “strip” which should be changed to a semi-colon (;). In Claim 26, line 12, it appears that “plate” was unintentionally struck through (i.e. deleted). It is believed that the word should read “plates”. In Claim 27, line 13, the claim sentence abruptly ends with “and”. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 27-28 and 33 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al. (US 2005/0201063).

Art Unit: 2835

Regarding independent Claim 27, Lee et al. teaches a cooling system for devices comprising at least one power semiconductor component (32b), the power semiconductor component (32b) being arranged along with a plurality of other semiconductor components (32a), on a printed circuit board (31) arranged in a plug-in contact strip (2) of a superordinate circuit carrier (1), the cooling system comprising:

- a cooling plate (53), mounted to the plug-in contact strip (2) in a region of the at least one power semiconductor component (32b), the cooling plate (53) having a cooling grid structure (53b/G2 area, Fig. 6) fitted on and extending from edges thereof (see Fig. 6);
- means (e.g. lower edges of 53) for pivoting the cooling plate (53) about an axis parallel to the plug-in contact strip (2) between a first mounting and maintenance position (upon installation/removal, not shown) wherein the cooling plate (53) is away from the power semiconductor component (31), and a second cooling and operating position (see Fig. 6) wherein the cooling plate (53) is pressed onto the power semiconductor component (32b).

Regarding Claim 28, Lee et al. teaches:

- the cooling plate (53) has cooling fins (see Fig. 6) on the cooling plate side not in contact with the power semiconductor component (32a).

Regarding Claim 33, Lee et al. teaches:

- the cooling grid structure (53b/G2 area) comprises metallic strips or cooling fins arranged at right angles to one another (see Fig. 6 and [0052]).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 10-11, 14-17 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2005/0201063) in view of Gauche et al. (US 2006/0139891).

Regarding independent Claim 10, Lee et al. teaches a cooling system for devices comprising a power semiconductor component (32b), the power semiconductor component (32b) being arranged on a printed circuit board (31) along with non-power type semiconductor components (32a), the printed circuit board (31) arranged in plug-in contact strip (2) of a superordinate circuit carrier (1), the cooling system comprising:

- a cooling plate (53), which is mounted in a pivotable manner on a plug-in contact strip (2) in a region of the power semiconductor component (32b), and which can be pivoted (via the edges of 53) about an axis parallel to the plug-in contact strip

Art Unit: 2835

(2), and a cooling grid structure (53b/G2) fitted on edges of the cooling plate (53) and projecting in directions parallel to the plug-in contact strip (2);

- the cooling plate (53) having a first mounting and maintenance position (not shown, i.e. upon installation) pivoted away from the power semiconductor component (32b), and a second cooling and operating position (Fig. 6) wherein the cooling plate (53) is pressed onto and covers the power semiconductor component (53b) and the cooling grid structure (53b/G2) covers the remaining non-power semiconductor components (32a) arranged on the printed circuit board (31) adjacent to the power semiconductor component (32b).

Lee et al. fails to disclose a plurality of power components, PCB's and plug-in contact strips. It would have been obvious to one having ordinary skill in the art at the time the invention was made to duplicate the plug-in contact strips for additional modular capacity the device, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. It is well known for computers to have multiple memory type modules and their associated slots (or strips) on a shared PCB.

Additionally, Lee et al. fails to teach the cooling plate (53) is pressed onto and only covering the power semiconductor component (53b). However, Gauche et al. teaches that it is known to individually cool heat components (e.g. 272) with a dedicated cooling plate coupling (240) (see Fig. 2 and [0020]). It would have been obvious to one having ordinary skill in the cooling art at the time the invention was made to individually cool components with a dedicated plate element, since Gauche et al. states at [0020]

Art Unit: 2835

that such a modification would have allowed for good engagement with the surface of the corresponding electronic component to facilitate heat transfer from the electronic component to the heat spreader. This would have improved the overall cooling of the device, while also allowing for more heat intensive components to be cooled to a higher degree (i.e. individualized cooling).

Regarding Claim 11, Lee et al. alone teaches:

- the cooling plate (53) has cooling fins (see Fig. 6, near G2) on the cooling plate side not in contact with the power semiconductor component (32b) (see Fig. 6).

Regarding Claim 14, Lee et al. alone teaches:

- the cooling grid structure (53b/G2) is arranged at an upper edge side of the cooling plate (53) and projects beyond an upper edge of the printed circuit board (31) and into a cooling air stream (e.g. F1, see Fig. 1 and [0040]).

Regarding Claim 15, Lee et al. alone teaches:

- a cooling air stream device (ventilator, not shown) that generates a cooling air stream (e.g. F1) is arranged in such a way that it has a forced cooling parallel to the plug-in contact strip (2) of the device to be cooled (see Fig. 1 and [0040]).

Lee et al. fails to disclose a plurality of plug-in contact strips. It would have been obvious to one having ordinary skill in the art at the time the invention was made to duplicate the plug-in contact strips for additional modular capacity the device, since it has been held

Art Unit: 2835

that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. It is well known for computers to have multiple memory type modules and their associated slots (or strips) on a shared PCB.

Regarding Claim 16, Lee et al. alone teaches:

- a cooling air stream device (ventilator, not shown) generates a cooling air stream (e.g. F1) which is perpendicular to the plug-in contact strip (2) of the device to be cooled, and into which the cooling grid structure (53b/G2) projects.

Lee et al. fails to disclose a plurality of plug-in contact strips. It would have been obvious to one having ordinary skill in the art at the time the invention was made to duplicate the plug-in contact strips for additional modular capacity the device, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. It is well known for computers to have multiple memory type modules and their associated slots (or strips) on a shared PCB.

Regarding Claim 17, Lee et al. alone teaches:

- the cooling system has two cooling plates (53, see Fig. 6) which are opposite one another and which are arranged in a pivotable manner (about their bottom edges) on a plug-in contact strip (2) in the region of a power semiconductor component (32b) (see Fig. 6).

Art Unit: 2835

Regarding Claim 30, Lee et al. alone teaches:

- the cooling grid structure (53b/G2) comprises metallic strips or cooling fins arranged at right angles to one another (see Fig. 6 and [0052]).

7. Claims 18-19, 22-26 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2005/0201063).

Regarding independent Claim 18, Lee et al. teaches a power semiconductor device having a cooling system comprising:

- at least printed circuit board (31) arranged in a plug-in contact strip (2) of a superordinate circuit carrier (1) and having at least one power semiconductor component (32b) positioned thereon and a plurality of other semiconductor components (32a) arranged adjacent thereto;
- a cooling plate (53) mounted in a pivotable manner on the plug-in contact strip (2) in a region of the at least one of power semiconductor component (32b) and configured to be pivoted (via the bottom edges of 53, e.g. upon installation) about an axis parallel to the plug-in contact strip (2); and
- a cooling grid structure (53b/G2, see Fig. 6) fitted on and extending from edges of the cooling plate (53), the cooling plate (53) having a first mounting and maintenance position (not shown) pivoted away from the power semiconductor component (53b), and a second cooling and operating position (Fig. 6) wherein the cooling plate (53) is pressed onto the power semiconductor component (32b)

Art Unit: 2835

and the cooling grid (53b/G2) covers at least a portion of the plurality of other semiconductor components (32a) (see Fig. 6).

Lee et al. fails to disclose a plurality of plug-in contact strips. It would have been obvious to one having ordinary skill in the art at the time the invention was made to duplicate the plug-in contact strips for additional modular capacity the device, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. It is well known for computers to have multiple memory type modules and their associated slots (or strips) on a shared PCB.

Regarding Claim 19, Lee et al. teaches:

- the cooling plate has cooling fins (see Fig. 6, G2 region) on the cooling plate (53) side not in contact with the power semiconductor component (32b) (see Fig. 6).

Regarding Claim 22, Lee et al. teaches:

- a cooling grid structure (see Fig. 6, G2 region) is configured at an upper edge side of the cooling plate (53) and projects beyond an upper edge of the printed circuit board (31) and into a cooling air stream (e.g. F1, see [0040]).

Art Unit: 2835

Regarding Claims 23 and 24, Lee et al. teaches:

- a cooling air stream device (ventilator, not shown) that generates a cooling air stream (e.g. F1) is arranged in such a way that it has a forced cooling parallel to the plug-in contact strip (2) of the device to be cooled (see Fig. 1 and [0040]);
- a cooling air stream device (ventilator, not shown) generates a cooling air stream (e.g. F1) which is perpendicular to the plug-in contact strip (2), and into which the cooling grid structure (G2) projects (see, for example, Fig. 1).

Lee et al. fails to disclose a plurality of plug-in contact strips. It would have been obvious to one having ordinary skill in the art at the time the invention was made to duplicate the plug-in contact strips for additional modular capacity the device, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. It is well known for computers to have multiple memory type modules and their associated slots (or strips) on a shared PCB.

Regarding Claim 25, Lee et al. teaches:

- a second cooling plate (53) is mounted in a pivotable manner on the plug-in contact strip (2) in the region of a power semiconductor component (32b) opposite to the cooling plate (53) and on an other side of the printed circuit board (31) (see Fig. 6)

Art Unit: 2835

Regarding Claim 26, Lee et al. teaches a method for cooling a device having a power semiconductor component (32b), the method comprising:

- mounting a pivotable cooling plate (53) onto a plug-in contact strip (2) of a superordinate circuit carrier (1), the cooling plate (53) being in a mounting and maintenance position (upon installation/removal, not shown) and having a cooling grid structure (53b/G2 area) fitted on and extending from edges thereof (see Fig. 6);
- fitting a printed circuit board (31) into the plug-in contact strip (2), the printed circuit board (31) having at least one power semiconductor component (32b) positioned thereon and a plurality of other semiconductor components (32a) arranged adjacent thereto, wherein the cooling plate (53) are positioned along the plug-in contact strip (2) region of the power semiconductor components (32b);
- pivoting the cooling plate (53) about an axis parallel to the plug-in contact strip (2) into a second cooling or operating position, wherein the cooling plate (53) are held in contact with a corresponding power semiconductor component (32b) of a corresponding printed circuit board (31) and the cooling grid structure (53b/G2 area) covers the plurality of other semiconductor components (32a, see Fig. 6) adjacent thereto;
- orienting a device (ventilator, not shown) generating a cooling air stream (e.g. F1), such that the cooling air stream (e.g. F1) flows parallel or perpendicular to the plug-in contact strip (2) (see Fig. 1 and [0040]; and

Art Unit: 2835

- providing the cooling air stream (F1) during operation of the power semiconductor component (32b) in the event of a critical temperature of the power semiconductor components being reached (i.e. component failure).

Lee et al. fails to disclose a plurality of power components, cooling plates, printed circuit boards and a plurality of plug-in contact strips. It would have been obvious to one having ordinary skill in the art at the time the invention was made to duplicate the printed circuit card and the plug-in contact strip for additional modular capacity the device, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. It is well known for computers to have multiple memory type modules and their associated slots (or strips) on a shared PCB.

Regarding Claim 31, Lee et al. teaches:

- the other semiconductor components (32a) comprise semiconductor memory components (see [0027]).

Regarding Claim 32, Lee et al. teaches:

- the cooling grid structure (53b/G2) comprises metallic strips or cooling fins arranged at right angles to one another (see Fig. 6 and [0052]).

Response to Arguments

8. Applicant's arguments with respect to claims 10-11, 14-19 and 22-28 have been considered but are moot in view of the new ground(s) of rejection. Regarding the "pivotable" limitation of the claims, the examiner considers any device to be "pivotable", for example, along the edges of the device. The edges of plate 53 can be brought into contact with the PCB 31 and pivoted into place, thereby satisfying the "pivotable" limitation. The Applicant is recommended to further claim the pivoting ability of the plate in regards to the **structure** that enables such pivoting.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references teach plate type cooling structures: Duesman et al. (US 6,707,673), Im et al. (US 2004/0250989), Janzen et al. (US 6,888,719), Gates et al. (US 2005/0276021), Foster et al. (US 2006/0056154), Chang (US 7,312,996), Lai et al. (US 7,349,219), Lai et al. (US 7,349,220), Ni (US 7,365,985), Hoss et al. (US 7,400,506) and McGuff et al. (US 7,403,383).

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRADLEY H. THOMAS whose telephone number is (571)272-9089. The examiner can normally be reached on 7:00am - 3:30pm (Eastern).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash N. Gandhi can be reached on 571-272-3740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

Application/Control Number: 10/598,285

Page 15

Art Unit: 2835

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BHT

/Jayprakash N Gandhi/
Supervisory Patent Examiner, Art Unit 2835